What is claimed is:

1. A process comprising treating a complex aluminum compound of the formula $R^4{}_2AlO(R^4AlO)_mAlR^4{}_2$ wherein each R^4 is independently selected from the group consisting of C_{1-20} hydrocarbyl radicals and m is from 3 to 50, with one or more carbohydrates in a weight ratio of aluminum complex to carbohydrate from 1:100 to 100:1 at a temperature from 0°C to 200°C for a time of at least 5 minutes.

2. The process according to claim 1, wherein the carbohydrate is selected from the group consisting of monosaccharides and polysaccharides.

3. The process according to claim 2, wherein in the aluminum complex R^4 is a C_{1-4} alkyl radical and m is from 5 to 30.

4. The process according to claim 3, wherein the weight ratio of aluminum complex to carbohydrate is from 1:25 to 25:1.

5. The process according to claim 4, wherein the carbohydrate is a C_{3-6} monosaccharide.

6. The process according to claim 4, wherein the carbohydrate is a polysaccharide.

7. The process according to claim 6, wherein the polysaccharide is a homoglycan polysaccharide.

8. The process according to claim 7, wherein the homoglycan polysaccharide is unbranched.

9. The process according to claim 8, wherein the homoglycan polysaccharide is cellulose.

10. A catalyst system comprising a transition metal complex in the presence of an activator comprising a complex aluminum compound of the formula $R^4{}_2AlO(R^4AlO)_mAlR^4{}_2$ wherein each R^4 is independently selected from the group consisting of $C_{1\text{-}20}$ hydrocarbyl radicals and m is from 3 to 50 which has been treated with one or more carbohydrates in a weight ratio of aluminum complex to carbohydrate from 1:100 to 100:1 at a temperature from 0°C to 200°C, to provide a molar ratio of treated aluminum to transition metal from 5:1 to 1000:1.

11. The catalyst system according to claim 10, wherein the transition metal is selected from the group consisting of Ti, V, Zr, Hf, Cr, Fe, Co, Ni and Pd.

12. The catalyst system according to claim 11, wherein the catalyst has the formula:

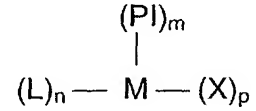
$$(L)_n — M — (X)_p$$

wherein M is a transition metal; L is a monoanionic ligand selected from the group consisting of a cyclopentadienyl-type ligand, a bulky heteroatom ligand and a phosphinimine ligand; X is an activatable ligand; n may be from 1 to 3; and p may be from 1 to 3, provided that the sum of n+p equals the valence state of M, and further provided that two L ligands may be bridged by a silyl radical or a C_{1-4} alkyl radical.

13. The catalyst system according to claim 12, wherein the cyclopentadienyl-type ligand is a C_{5-13} ligand containing a 5-membered carbon ring having delocalized bonding within the ring and bound to the metal atom through covalent η^5 bonds and said ligand being unsubstituted or up to fully substituted with one or more substituents selected from the group consisting of C_{1-10} hydrocarbyl radicals in which hydrocarbyl substituents are unsubstituted or further substituted by one or more substitutents selected from the group consisting of a halogen atom and a C_{1-4} alkyl radical; a halogen atom; a C_{1-8} alkoxy radical; a C_{6-10} aryl or aryloxy radical; an amido radical which is unsubstituted or substituted by up to two C_{1-8} alkyl radicals; a phosphido radical which is unsubstituted or substituted by up to two C_{1-8} alkyl radicals; silyl radicals of the formula $-Si-(R)_3$ wherein each R is independently selected from the group consisting of hydrogen, a C_{1-8} alkyl or alkoxy radical, and C_{6-10} aryl or aryloxy radicals; and germanyl radicals of the formula $Ge-(R)_3$ wherein R is as defined above.

14. The catalyst system according to claim 13, wherein X is selected from the group consisting of a hydrogen atom; a halogen atom, preferably a chlorine or fluorine atom; a C_{1-10} hydrocarbyl radical; a C_{1-10} alkoxy radical; a C_{5-10} aryl oxide radical; each of which said hydrocarbyl, alkoxy, and aryl oxide radicals may be unsubstituted by or further substituted by one or more substituents selected from the group consisting of a halogen atom; a C_{1-8} alkyl radical; a C_{1-8} alkoxy radical; a C_{6-10} aryl or aryloxy radical; an amido radical which is unsubstituted or substituted by up to two C_{1-8} alkyl radicals; and a phosphido radical which is unsubstituted or substituted by up to two C_{1-8} alkyl radicals.

15. The catalyst system according to claim 14, wherein the transition metal complex has the formula:



wherein M is a transition metal; PI is a phosphinimine ligand; L is a monoanionic ligand selected from the group consisting of a cyclopentadienyl-type ligand or a bulky heteroatom ligand; X is an activatable ligand; m is 1 or 2; n is 0 or 1; and p is an integer and the sum of m+n+p equals the valence state of M.

16. The catalyst system according to claim 15, wherein the cyclopentadienyl-type ligand is selected from the group consisting of a cyclopentadienyl radical, an indenyl radical and a fluorenyl radical which radicals are unsubstituted or up to fully substituted by one or more

substituents selected from the group consisting of a fluorine atom, a chlorine atom; C_{1-4} alkyl radicals; and a phenyl or benzyl radical which is unsubstituted or substituted by one or more fluorine atoms.

17. The catalyst system according to claim 16, wherein in the aluminum complex R^4 is selected from the group consisting of C_{1-4} alkyl radicals and m is from 5 to 30.

18. The catalyst system according to claim 17, wherein the carbohydrate is a C_{3-6} monosaccharide.

19. The catalyst system according to claim 17, wherein the carbohydrate is a polysaccharide.

20. The catalyst system according to claim 19, wherein the polysaccharide is a homoglycan polysaccharide.

21. The catalyst system according to claim 20, wherein the homoglycan polysaccharide is unbranched.

22. The catalyst system according to claim 21, wherein the homoglycan polysaccharide is cellulose.

23. The catalyst system according to claim 10, further comprising a support.

24. The catalyst system according to claim 23, wherein the support is silica.

25. The catalyst system according to claim 18, further comprising a support.

26. The catalyst system according to claim 25, wherein the support to silica.

27. The catalyst system according to claim 19, further comprising a support.

28. The catalyst system according to claim 27, wherein the support to silica.

29. The catalyst system according to claim 20, further comprising a support.

30. The catalyst system according to claim 29, wherein the support is silica.

31. The catalyst system according to claim 21, further comprising a support.

32. The catalyst system according to claim 31, wherein the support is silica.

33. The catalyst system according to claim 22, further comprising a support.

34. The catalyst system according to claim 33, wherein the support is silica.

35. The catalyst system according to claim 12, wherein in the aluminum complex R^4 is selected from the group consisting of C_{1-4} alkyl radicals and m is from 5 to 30.

36. The catalyst system according to claim 35, wherein the carbohydrate is a C_{3-6} monosaccharide.

37. The catalyst system according to claim 35, wherein the carbohydrate is a polysaccharide.

38. The catalyst system according to claim 37, wherein the polysaccharide is a homoglycan polysaccharide.

39. The catalyst system according to claim 38, wherein the homoglycan polysaccharide is unbranched.

40. The catalyst system according to claim 39, wherein the homoglycan polysaccharide is cellulose.

41. The catalyst system according to claim 12, further comprising a support.

42. The catalyst system according to claim 41, wherein the support is silica.

43. The catalyst system according to claim 36, further comprising a support.

44. The catalyst system according to claim 43, wherein the support to silica.

45. The catalyst system according to claim 37, further comprising a support.

46. The catalyst system according to claim 45, wherein the support to silica.

47. The catalyst system according to claim 38, further comprising a support.

48. The catalyst system according to claim 47, wherein the support is silica.

49. The catalyst system according to claim 39, further comprising a support.

50. The catalyst system according to claim 49, wherein the support is silica.

51. The catalyst system according to claim 40, further comprising a support.

52. The catalyst system according to claim 51, wherein the support is silica.

53. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 10.

54. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 12.

55. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 18.

56. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 19.

57. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 24.

58. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 26.

59. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 28.

60. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 12.

61. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 36.

62. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 37.

63. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 42.

64. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 44.

65. A process for the polymerization of a mixture comprising from 80 to 100 weight % of ethylene and from 0 to 20 weight % of one or more C_{3-8} alpha olefins at a temperature from 80°C to 250°C in the presence of a catalyst system according to claim 47.